Development (1948) Department

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G.O. No. 4124

Dated 9.8.1948

[Despatch Abstract.]

Agriculture - Indian Council of Agricultural Research - Scheme for the establishment of Bee - Research stations - Forwarded.

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

SCHEME FOR THE ESTABLISHMENT OF REGIONAL BEE-RESEARCH STATIONS.

1. Introduction.- Honey has been in use in India both as a food as well a medicine from the very early days and the needs of the country have been met from the local supplies only The main source of the bulk quantities has been the Rock Bee (Apis dorsata). The crude and unclean methods of extraction of the honey, its improper preservation and some times the deliberate adulteration are too well known to deserve any special mention here. Improved methods of bee-keeping were planned and attempted in India about four decades ago by one or two amateurs as well as by the then Imperial Entomologist, Pusa. The habits of the indigenous speciedof honey bees were investigated and it was found that only the Indian bee (Apis Indica F) was suitable for domestication. A few colonies of the European bee also (Apis mellifica F) appear to have been tried but with no success. In South India the Jesuit Fathers at Trichinopoly were the pioneers in the trials with the Indian been and some encouraging results have been recorded by them by 1916. Except for the enthusiasm of these amateurs, little or no interests was evinced by the public till the phenomenal depression days of 1930. Rural uplift, improving the standard of living and finding out ways and means of providing sufficient occupation for the ryot during the off-season, etc., were the main cry of the day. Bee-keeping was consideredto be one of the profitable cottage industries. Government agencies as well as a few missionary and philanthropic organizations evinced in extraordinary zeal in giving a fillip towards the popularizing of this industry. The efforts were not in vail. The industry was very well received by the public and remarkable strides were made in its speread - there being over 10,000 hives in this Presidency, maintained by mostly private enthusiasts. By abou 1940 with the outbreak of the war, there was a deterioration in the progress, probably due to the want of spoon feeding by the organizing agencies and partly to the high prices of agricultural produce and other easier methods of making money. With all this, the demand for pure honey has been on the increa and sometimes even fancy prices up to Rs. 5 per pound were offered.

II. Need for research. - Now with the return of normal conditions and attainment of the long cherished independence of the country, our motto should be to keep pace with the other countries in all lines of developments. It is needless to add here that bee-keeping is one of the main Agro-industries of the Western countries and remarkable progress has been made in this direction. India is a country of unlimited agricultura and forest wealth and as such there is always bountiful supply of bee-pasturage. The work of the previous two decades on the Indian bee has helped us to gauge its potentialities and limitations under the existing conditions and the future line of work would, therefore, lie in the augmentation of the presen knowledge with the help of the up-to-date methods of breeding, hybridization, with better varieties, etc. Too much stress on the urgent need for further research is hardly necessary here, as the following few aspects would indicate : -

(1) The public are fast realizing the medicinal and food value of honey and the demand for the genuine stuff is on the increase.

(2) The country is not self-sufficient in the supply of t is material in spite of the existence of the unlimited natural resources.

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(3) There is enough evidence to show that we have still to depend on foreign countries even for this material.

(4) Past work indicates a bright future for the industry and enough natural facilities exist in the country.

(5) The industry would provide an ideal and profitable side line to the ryot and thus augument the scanty income from agriculture.

(6) The indirect benefit which accrues and goes to enrich the country's resources by means of cross-pollination by bees in invaluable.

(7) Quantities ofpollen and nectar present in the flowers of most trees and plants are at present going to waste and been are the only agents which are capable of collecting these materials and make them available for man's use.

III. Work done.- Considerable amount of spade work has already been done on apis indica at Coimbatore. The knowledge and experience on hand is quite adequate to run an apiary of this been successfully and a short resume of the salient features of the aspects worked out is given below:-

A. Research - (a) General habits of bees.:-(1) Brreding and swarming seasons, (2) Life history of the three different members, (3) their longivity, (4) Egg-laying capacity of the queen, (5) Range of flight, (6) Response of the bees to the weather and (7) Individual pollen-bearing capacity etc.

(b) Management.- (1) Hiving technique, (2) Building up the strength of colonies, (3) Swarming and its control, (4) Dividing, (5) Uniting, (6) Queen-rearing and (7) Queen Introduction, etc.

(c) Pasturage.- A fairly exhaustive list of the nectar and pollen yielding flora of this Presidency with details regarding the months of flowering status as bee-pasturage crops, time of visit by the bees, etc. has been compiled.

(d) Enemies.- The important bee enemies of the Presidency have been studied. The most destructive of these is the wax moth - Galleria mellonella. Efficient, cheap and simple control methods have been evolved and are being advocated.

(e) Appliances.- Suitable appliances such as honey extractors drone and queen traps, queen excluders, bee-escapes, comb foundation sheets, etc., were either devised or adapted and these are exceedingly popular with the public.

(f) Honey. - (1) Chemical analysis of a few samples were made . Methods of proper ripening, storage, artificial granulation, etc., were adopted.

(2) Enormous quantities of honey are collected from the forests from the combs of the Rock Bee, Apis dorsata. The methods of extraction and preservation were rather crude with the result the honey deteriorated in quali ty during storage. The problem was worked out thoroughly. Appliances for the hygienic extraction and methods of ripening and proper preservation of honey were devised. These methods are reported to be successfully practised in one or two centres of the Forest Department.

B. Propaganda.- The Industry is being popularised by the issue and distribution of comprehensive publications - priced as wellas free in English and in the different vernaculars. Arrangements are made for the supply of appliannes at moderate rates. Trainin is given in the subject to interested parties. Exhibits regarding bee-keeping always form an attracti

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attractive feature in most of the exhibitions and fairs.

With so much work at our credit, it is quite opportune that proposals for a further intensive study of the subject are on the move. A gist of the proposed items of work is given below, If the scheme is sanctioned and worked for the time stipulated, I feel that almost, the last word can be said on the subject by about the termination of the period.

IV. Future work. - The proposed lines of research are enumerated below:-

A(1) The Indian bee- Apis indica - Classification.- The only two distinct varieties of Apis indica F that occur in South India are the plains and hill varieties. Specimens of these two categories were sent to the Imperial Bureau of Entomology sometime back and both of them were identified as Apis indica. F. On this authority, the two varieties may be ascribed only as two biological races. The apprent distinguishin features between the two are that the hill bees and their queen are darker in colour and slightly begger in size in their natural habitat. From the preliminary trials made at Coimbatore the bigger size and the colour of the workers appear to mellow down to those of the plains bees in the course of one or two years, while the dark colour of the queen alone persists. The change in the colour and the size of the workers may be due to the exposure to the local weather conditions and in the case of the queen, the persistence of her colour may be due to her remaining indoors all her lifetime. There are a few other points of difference in their habits, temper, foragoing and breeding capacities, etc., but these factor may hot afford sufficient scientific evidence to warrant their classification into differer varieties or strains. A more reliable index would be the study of the biometric characters regarding the tongue length, leg length, sizes of wings, and cubital cells, their brood cells Bees from different localities of the plains as well as the hills may be collected and studied for these details. Attempts may also be made to correlate these factors with the working capacity of the bees.

(2) Breeding and selection. - Colonies with desirable traits like mild temper, non-swarming propensity, good honey gathering capacity, etc., can be isolated and bred for desirable qualities. This work will be continued both with the hill and plains bees.

(3) Acclamatization of the hill bees on the plains.- These bees are better breede s and honey-gatherers in their natural haunts, which may probably be due to the more favourable local climatic and pasturage conditions. Trials will be made to transport a few colonies of these bees and study their behavious on the plains.

(4) Swarming and its control.- This has been and still is a real headache even in Western countries where bee-keeping has been perfected as a fine art. Some palliative methods have been devised and found fairly effective. The India bee is notorious for its swarming propensities and until and unless definite methods to curb this undesirable instinct are devised, domestication of the Indian bee cannot be said to be perfect.

B. The foreign bees.- The foreign bees.- (1) Apis mellifica. - The bee is reputed to give phenomenal honey yields in the temperate regions. A number of attempts have been made to import this species and acclamatize it in India for the past three or four decades and no case of any success is on record so far. I am personally somewhat sceptic regarding their thriving properly under Indian conditions, but the trials are worth taking up in view of the enormour possibilities, in case the attempts are successful. Care should however, be taken to import colonies free from infectious diseases and only from

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from places having similar climatic and pasturage conditions as those of South India. America and Australia will be the sources to be tried. The behaviour of the colonies may be observed both on the hills as well as on the plains. A very careful eye will be kept on their progress and causes for their success or failure in this country worked out.

(2) Besides, the European bee, the indigenous honey bee of Egypt - Apis fasiata - is also said be a very good honey-gatherer If possible a few colonies of these also will be imported and tried, Since the climatic and weather conditions of this country may perhaps be more similar, if not more adverse, than those prevalent in India. Other species from near about the tropies may also be imported if their performances are reported to be better.

(3) Artificial insemination.- Attempts will be made to effect a cross between the foreign bee and the Indian bee under controlled conditions and evolve a better strain. Owing to the peculiar mating habits of the queen ordinary methods of crossing are not feasible. They have, therefore, to be restricted to artifical insemination, which is by itself a special art, requiring high skill and competence.

C. Bee -appliances.- (1) The present type of bee hive (Newton) in common use in South India is just enough to meet the breeding and honey gathering capacity of Apis indica. There is a possibility of improving, their performance if they are accommodated in bigger hives. Apart from this, the evolution of a better type of bee either by selection or by corssing, may authomatically neces itate the evolution of a bigger type of hive. The designing of more efficient appliances to suit the needs would, therefore, be one of the main items of research.

(2) Observations made, so far, show that individual colonies of Apis indica refuse to increase beyond a certain limit, irrespective of the conditions and environments. Taking the population of the hive as the 'index' ofthe future performance, trials will be conducted to devise suitable technique and appoicances which can effect and accomoodate a larger population and probably by having two or more queens in a hive. This method will be only tentative until the results of the hybridizing and selection work are availabl

(3) Miner Appliances for the easy transit and distribution of bee packages and queens will be devised.

(4) Minor appliances similar to the 'Porter' bee escape, the drone trap, the warm trap may be modified and tried.

(5) Queen rearing.- Technique as well as appliances for rearing queens under the current economic possibilities of the Indian bee are available and the work may be pursued along with the advances in other directions.

(6) Promising and useful appliances will be standardized and made available for the public.

D. Bee enemies and diseases - Enemies.- Enough knowledge have already accumulated regarding the bee enemies occurring in this Presidency but a sharp look-out will be kept for the incidence of any new forms.

(2) Diseases.- The Indian bee has, so far, been reputed to be free from any diseases but complaints are occasionally received from Madras and a few other places wherein a high death-rate of the brood as well as the young bees have been reported. Preliminary

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Preliminary observations have gone to show that it is more due to the climatic factors than to any disease organism. The investigations may be continued.

E.Pasturage.- (1) A farily exhaustive list of the pasturage plants SouthIndia is available and the line of work willbe continued with details regarding the month of flowering the status, etc.,

(2) Studies made, so far , have shown that bee pasturage is the deciding factor for the success or otherwise of bee-keeping. It was also found that availability and collection of the bee-foods are influences by certain climatic and weather factors like temperature, humidity, high winds success or failure of the monsoon, etc., and some interesting data have been gathered. A continuation of this line of work, especially on the influence of these factors on the secretion of nectar will yield fruitful results.

(3) Determination of the actual quantities of pollen and nectar collected by individual bees of different varieties from different crops would provide experimental data to correctly assess the working capacity of the bees and the status of the crops concerned.

(4) Pollen substitutes.- During periods of dearth of pasturage bee colonies stop breeding and consequently go down in strength. Of the two bee foods, nectar defifiene defficiency can be augmented by feeding with sugar or jaggery syrup but all our previous attempts to induce them to take to artificial poller, substitutes have not been successful. The European bee isreported to take a number of these substitutes. Any success achieved in this aspect would go a long way to solve one of the major problems of bee-keeping in South India.

F.Bees and pollination. - The importance of bees in pollination can probably be better evaluated in the case of fruit crops. This may necessitate the stationing of an assistant in the fruit-growing areas of the Presidency, probably at Kodur, exclusively for the work. Details of the work will be furnished when the scheme is intiated.

G. Bee products.- The chemical and physical properties of honeys from different sources have to be throughly investigated and standards of Indian honeys fixed. A large scale propaganda of the improved methods of extraction and preservation of Rock Bee honey may yield fruitful results.

11. Propaganda.- As the Coimbatore centre has been assigned the starus of a Central Research Station, a certain amount of propaganda work also has to be undertaken if itis so stipulated. The lines of work will consist of -

(1) Holding short courses for enthusiasts.

(2) Arranging the supply of suitable applieances to interested parties.

(3) Arranging for marketing of the produce from large-scale bee-keepers if necessary.

(4) issue of popular publications etc.

V.Venue of work. - (1) Coimbatore will be the centre of research and the headquarters of the officer in charge of the scheme. Important items of work such as corssing, breeding, selection, observations on the foreign bees etc., as envisaged in the programme of work will be conducted here. He will be assisted by a staff of two assistants and two fieldmen.

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(2) Another assistant can be posted at Coonoor. A few colonies of the foreign bees and hill bees will be kept under observat on there. The hives can be located at the Pomological station. Apart from general observations on the progress and habits of the bees, the importance of bees for pollinating exotic fruit trees will also be studied. He will have one fieldman to help him.

(3) One assistant can be posted at Kodur. He will maintain a dozen hives of Apis indica and study the influence of bees on the pollination and setting of Indian fruits. He will be helped by a fieldman.

(4) One Chemistry assistant can be entertained for a period of three years commencing from the third year of the inception of the scheme to study on the physical and chemical qualities of honey. He will work at Coimbatore and will be assisted by an attender.

VI Staff:- (1) The scheme will run for a period of five years under the entire control and guidance of the Goverment Entomologist, Coimbatore.

(2) Officer in charge.- An officer of the status of the Madras Agricultural Service willbe in charge of the scheme. In view of the peculiar mating habit of the bee the possibilities of cross-breeding lie only in artificial insemination. This is a highly specialized art and the services of an officer of high competence and professional skill of a superior order are necessary He should be a good Entomologist with sufficient experience in bee-keeping first and should also possess a fundamental knowledge of genetics and breeding technique. He should have a first hand expereince of the latest methods of bee-keeping, bee-breeding and artifical insemination in the Western countries. The post may, therefore, be advertised and a really capable hand recruited., if necessary, on a higher initial start.

(3) Subordinate staff.- Five assistants and four fieldmen as detailed below will be required for the scheme:-

Coimbatore.

(1) Officer in charge of the scheme.

(2) Two assistants.

(3) Two fieldmen.

(4) One Chemistry assitant for a per od of three years from the third year of the scheme.

(5) One attender.

(6) One clerk.

(7) One peon.

1) One Assistant.
field 2) One/~~XXXXX~~ man

Kodur:-

(1) One assistant.

(2) One fieldman.

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Equipment.- The following are the equipment necessary by way of bee-colonies appliances, coolie labour, etc.:-

The present stock of bee-~~eloi~~ colonies in working condition and the appliances with the Department of Agriculture, at Coimbatore and Coonoor can be conveniently transferred to the scheme.

The additional equipment would be as follows:-

One dozen foreign bee-colonies.

Appliances for the same.

Sheds at Kodur and Coonoor.

One dozen hives for Kodur and appliances.

VII. The financial implications are furnished below

Financial Statement for the proposed bee-keeping scheme.

	I Year.	II Year.	III Year	Iv Year.	V Year.
Coimbatore.-					
Officer in charge at Rs.230 in the scale of Rs. 230-30/2-260-40/2-500-50/2 700 ..	2760	2760	3120	3120	3600
Two Assistants on Rs. 100 in the scale of Rs.100-5-140-10-220.	2400	2520	2640	2760	2880
Two Fieldmen on Rs.45 in the scale of Rs.45-2-55-1-60	1080	1128	1176	1224	1272
One Chemistry Assistant on Rs.100 in the scale of Rs. 100-5-140-10-220 from the III year of the scheme.	...	...	1200	1260	1320
One Laboratory attendant on Rs.19 in the scale of Rs. 19-1-32 for the Chemistry Assistant	....	...	228	240	252
One clerk onRs.45 in the scale Rs.45-3-60-2-90.	540	576	612	648	684
One Peon on Rs.16-½-24.	192	198	204	210	216
	6972	7182	9180	9462	10224
					43020
Dearness allowance -					
Dearness allowance for officer in-charge.	552	552	624	624	706
Dearness allowance for two assistants.	576	624	548	672	696
Deanness allowances for chemistry Assistant.	...	...	288	312	324
Deanress allowance for Laboratory Attendants	..	...	216	216	228

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	I Year.	II Year.	III Year.	IV Yea .	V Year.	
Dearness allowance for clerks..	264	264	264	264	264	
Dearness allowance for Peon..	216	216	216	216	216	
Deanress allowance for two fieldmen.	528	528	528	528	528	
Dearness allowance at the rates sanctioned in G.O.No.99, Finance, dated 29th Januaary1948.	2136	2184	2784	2832	2964	=
						12900

Coonoor.-

One Assistant onRs.100 in the scale of Rs.100-5-140-220.	1200	1260	1320	1380	1440	
One Fieldman on Rs.45 in the scale of Rs. 45-2-55-1-60.	540	564	588	612	636	
	1740	1824	1908	1992	2076	=
						9540.
Dearness allowacne for Assistant..	288	312	324	336	348	
Dearness allowance for fieldman	264	264	264	264	264	
	552	576	588	600	612	
						2928.

Kodur.-

Details regarding staff same as Coonoor.-						
Total under pay of establishment for the five years.	1740	1824	1908	1992	2076	
Total under dearness allowance of staff	552	576	588	600	612	
Hill allowance for the staff at Coonoor- Hill allowance for assistant..	270	270	270	270	270	
Hill allowance for fieldmen.	162	162	162	162	162	
	142	432	432	432	432	
						2150

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Contingencies -	Rs.
Recurring -	
Coimbatore 2 coolies at Rs.45 per month.	1080
Coimbatore one boy at Rs. 20 per month.	240
Coonoor one coolie at Rs.45 per month	540
Kodur one collie at Rs.45 per month	540
Other miscellaneous contingent expenditure Coimbatore centre.	1000
Coonoor and Kodur each at Rs.400	800
	4200

Non-Recurring.-	Rs.
One dozen foreign bee-colonies.	2000
Appliances, etc.	2000
Shed at Kodur and Coonoor	400
One dozen hives for Kodur and other appliances	500
Total.	4900

Travelling allowance -

At Rs.1,500 per year for five years.

Abstract of expenditure for the bee-keeping scheme for five years.

Non-recurring at Rs.4900.

	Rs.
Recurring -	
Pay of establishment (including officer-in-charge)	62,100
Dearness allowance of establishment (including officer-in-charge).....	18,756
Hill allowance for staff at Coonoor	2,160
Travelling allowance for entire staff...	7,500
Contingencies.	21,000
	1,11,516 or 1,11,520

Development Department.

Letter Ms.No.4124 Dated 9-8-1948.

To

The Secretary, to the ~~Government~~ Indian Council
of Agricultural Research,
New Delhi.

Sir,

Sub: Agriculture - Indian Council of Agricultural Research - Schemes for the establishment of Bee Research Stations - Forwarded.

Ref: Your letter No.F 8(5)/47-A.H. dated 19-2-1948.

I am directed to forward herewith a scheme for the intensive study of honey bees, to he run for a period of five years. The Scheme envisages the establishment of a central Research Station at Coimbatore with the regional stations. The Scheme is estimated to cost Rs.1,11,520 recurring for five years and Rs.4,900 non-recurring. It is proposed to share the recurring expenditure equally between the Indian Council of Agricultural Research and the Provincial Government, and the non-recurring expenditure will be entirely borne by the Provincial Government.

2. I am to request that the sanction of the council may kindly be detained and communicated to this Government at an early date.

Yours faithfully,

Sd/-xxxxxx,
24-7-48.

Copy to the the Director of Agriculture.
He is requested to submit the usual printed copies of the Scheme for forwarding to the Indian Council of Agricultural Research at an early date.

/True copy/

S. Jayaraman 13/5

Office Assistant,
Madras Record Office.

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